

Hornig, of Philadelphia, has collected similar galls on wild roses at Bustleton, Pa., and Mr. E. L. Dickerson records them as occurring on wild roses at Nutley, N. J. Mr. Geo. G. Atwood of the New York Department of Agriculture writes that he has often seen abnormal swellings of rose stocks, particularly Manetti and multi-flora.

Considering the nature of the injury, it is evident that the cutting and burning of infested stems is the only method of control.

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## SOME COCCINELLID STATISTICS

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In the western part of Oregon plant lice are very abundant and destructive. This is especially true in the Willamette Valley, where we find agriculture well advanced, the climate quite mild and vegetation luxurious. Among the various species found in the valley, few, if any, are more destructive than *Phorodon humuli* Schrank, the hop aphid; *Aphis brassicæ* Linn., the cabbage aphid; and *Aphis viburni* Scop., an aphid found on several garden and other plants.

We have in the valley also several well-known species of Coccinellidæ which usually do heroic work in checking the plant lice, but the writer has noticed the absence of a few species of these beneficial insects that are quite common in other sections of the country. Hence I decided to introduce some of these into this section of Oregon, and, as a preliminary step, have taken a few statistics on the relative numbers of the different species of coccinellids found feeding on the three species of aphids mentioned, and also feeding from the cell sap secreted by stipule glands of vetch plants. Data, which gives us some idea of the numbers of lady-birds present in any situation, and especially data which gives the ratios of the numbers of individuals of each species present and preying on any plant louse, are very serviceable in helping estimate the value of a species after it has once been introduced.

In order to get the population statistics we collected all adult beetles that were present in the following situations: feeding on *Phorodon humuli* Schrank, on hops; feeding on *Aphis viburni* Scop., on thistles; feeding on *Aphis viburni* Scop., on lamb's quarters; feeding on *Aphis brassicæ* Linn., on kale; and, lastly, feeding in vetch, chiefly from a cell sap secreted by special glands on the stipules of the leaves.

The collections from hops were made August 19, 1913. We collected all of the individuals found above our knees and up to as high as we could reach. Later counts showed that 209 individuals were captured. These were distributed among the different species as follows: *Hippo-*

*damia spuria* Leconte, 25; *Hippodamia convergens* Guér., 116; *Coccinella trifasciata* Cr., 12; *Coccinella transversoguttata* 1; *Cycloneda sanguinea* Linn., 53; *Adalia bipunctata* Linn., 2.

On August 19, 1913, collections were made of all the coccinellids found feeding on many thistles, upon *Aphis viburni* Scop. The total number of beetles found was 276. These were distributed as follows: *Hippodamia spuria* Leconte, 17; *Hippodamia convergens* Guér., 241; *Hippodamia parenthesis* Say, 2; *Coccinella 9-notata* Hbst., 7; *Coccinella trifasciata* Cr., 9.

On August 20, 1913, a large number of weeds, lamb's quarters, were examined and all adult lady-birds were collected. They were feeding on *Aphis viburni* Scop. In all 988 beetles were gathered. They belonged to six species, and in the following numbers: *Hippodamia spuria* Leconte, 30; *Hippodamia convergens* Guér., 913; *Hippodamia parenthesis* Say, 6; *Coccinella 9-notata* Hbst., 26; *Coccinella transversoguttata* Fald., 1; *Cycloneda sanguinea* Linn., 12.

In a kale patch feeding on *Aphis brassicæ* Linn., we collected 344 adult lady-birds. These represented all that were found on four rows of kale. The collections were made August 21, 1913. These different individuals were distributed among four species as follows: *Hippodamia spuria* Leconte, 28; *Hippodamia convergens* Guér., 314; *Hippodamia parenthesis* Say, 1; *Coccinella 9-notata* Hbst., 1.

TABLE SHOWING THE RELATIVE ABUNDANCE OF THE DIFFERENT SPECIES OF COCCINELLIDS FOR FIVE DIFFERENT SITUATIONS IN PERCENTAGE TERMS OF THE TOTAL POPULATION PRESENT

Situations	Relative Abundance Expressed in Percentages of Total Population Present							
	Hippodamia spuria	Hippodamia convergens	Hippodamia parenthesis	Coccinella 9-notata	Coccinella trifasciata	Coccinella transversoguttata	Cycloneda sanguinea	Adalia bipunctata
Feeding on <i>Phorodon humuli</i> , on hops . . .	11.9	55.5	—	—	5.9	0.5	25.3	1.0
Feeding on <i>Aphis viburni</i> , on thistles . .	6.2	87.3	0.7	2.5	3.3	—	—	—
Feeding on <i>Aphis viburni</i> , on lamb's quarters . . . . .	3.0	92.4	0.6	2.6	—	0.1	1.2	—
Feeding on <i>Aphis brassicæ</i> , on kale . .	8.1	91.3	0.3	0.3	—	—	—	—
Feeding on cell sap of vetch . . . . .	8.60	87.05	—	2.69	1.26	—	0.31	—

The collections from the vetch fields were made June 4, 1913. We selected a strip of luxuriant vetch 240 feet long and six feet wide, and

collected all the adult beetles present. In our hunt we turned back and over the vetch plants in order to get the coccinellids from the lower leaves and the ground. This half-day hunt resulted in the capture of 633 lady-birds. The numbers of individuals of each species were as follows: *Hippodamia spuria* Leconte, 55; *Hippodamia convergens* Guér., 551; *Coccinella 9-notata* Hbst., 17; *Coccinella trifasciata* Cr., 8; *Cycloneda sanguinea* Linn., 2.

From these figures we get the following percentages of the total coccinellid populations for each species found in the different situations. They are given above in tabular form.

These percentages may be expressed graphically as I have done in Figs. 25 and 26. In Fig. 25 it is at once noted that *Hippodamia convergens* Guér. is by far the most common species, in fact the individuals of this species constitute a majority of the coccinellid population in each situation. Perhaps the next most striking feature noticed is the large number of individuals of *Cycloneda sanguinea* Linn., found feeding on the hop aphid. In the statistics for the other situations this species is quite rare, being absent entirely in the statistics for the cabbage aphid, on kale and from the counts for *Aphis viburni* Scop., on thistles. In four of the situations *Hippodamia spuria* Leconte is found to be second in numbers, as it doubtless is in importance. This is in accordance with a previous statement made by the writer (JOURNAL OF ECONOMIC ENTOMOLOGY, Vol. 6, p. 404), but without the authority of population statistics. With the exception of *Coccinella trifasciata* Cr., when found feeding on the hop aphid, no other species is found in such numbers as to equal or exceed 5 per cent of the total population for any environment. Hence these rarer species are of little value from an economic standpoint on account of their small numbers.

In Fig. 26, we notice that similar conditions prevail in the vetch field. *Hippodamia convergens* Guér. predominates to the extent of constituting over 87 per cent of the total population. *Hippodamia spuria* Leconte comes second, while *Cycloneda sanguinea* Linn., so common in the hop fields, constitutes only a little over .3 of 1 per cent of the total population.

In closing, I may add that the numbers of *Hippodamia spuria* Leconte, found in these situations as compared with those of *Hippodamia convergens* Guér., do not compare as favorably as they do in the statistics obtained from hibernating masses. Here *Hippodamia spuria* Leconte will frequently be found to be present to the extent of about one-half the number of *Hippodamia convergens* Guér.

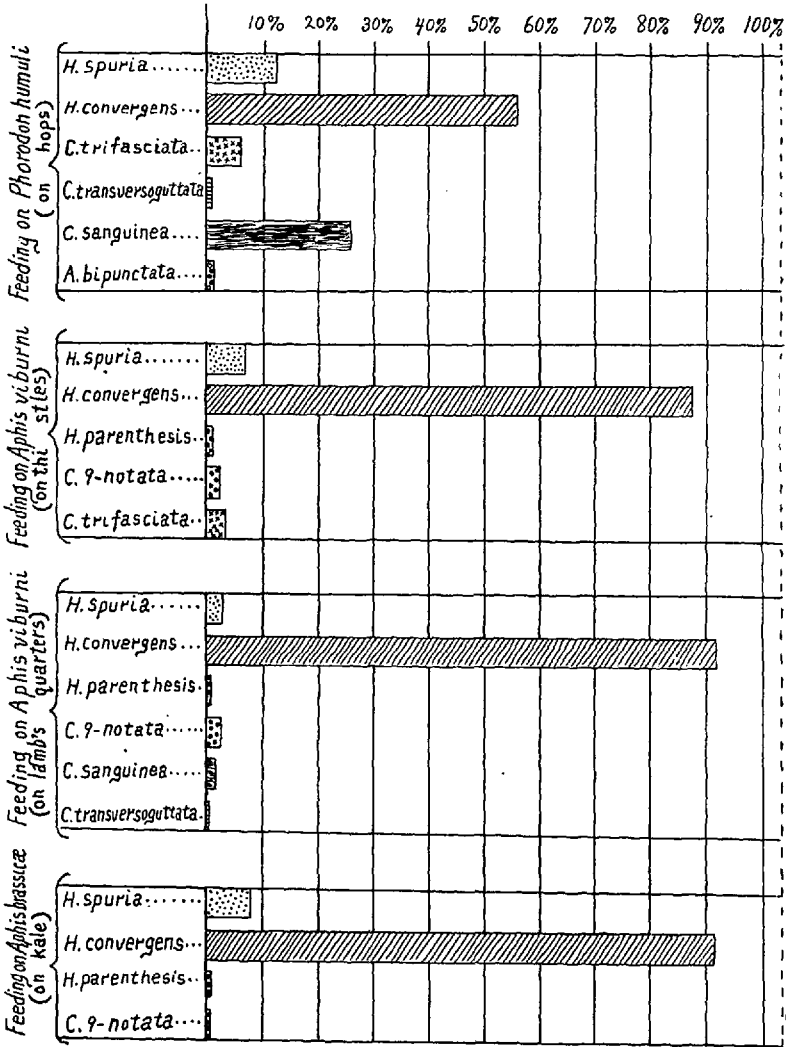


Fig. 25—Diagrams showing the relative numbers, expressed in percentage terms, of the total population of different species of Coccinellidae found in four situations

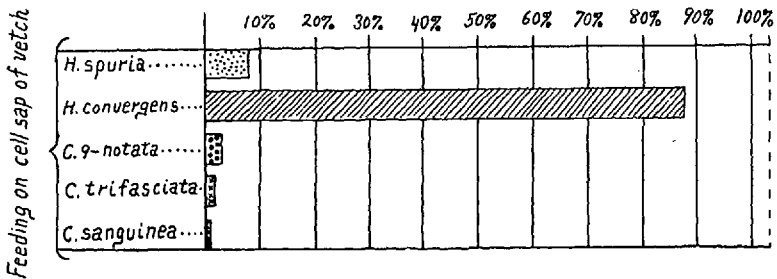


Fig. 26—Diagram showing the relative numbers, expressed in percentage terms, of the total population of different species of Coccinellidae found in each patch